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Environmental Management

Ajith Sankar R.N.



Environmental Management

Ajith Sankar R.N.

Organic Farmer

and

Founder—Ekatwa

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Preface

Thank you for reading this textbook.

Every generation believes that it is living in unique times. We too, are no different, and we have reasons to support our belief. No other generation in the history of mankind had access to the kind of physical comforts that we enjoy now. The accessibility to various lifestyle choices is so mind-boggling that we remain unfulfilled even after spending a full day in a shopping mall looking for clothes to wear for a special occasion. However, this obsession for physical comfort and gratifying the cravings of the mind also causes suffering, not just to oneself, but to all. As the acquisitive drive is on an increase, it impacts the balance of the universe. The growing human population and its demands on the planet, tend to exacerbate this imbalance.

We are witnessing an increasing prevalence of extreme weather conditions to such an extent that we have become numb to those affected by these disasters. We are going through an extinction wave where the loss of species is thousand times the normal rate, and where forest area equivalent to that of a football field is being destroyed every second! The planet is witnessing the existence of conditions vastly different from those observed in the last 6,50,000 years. Industries ranging from insurance to winter tourism are being negatively affected by this imbalance. In this context, shouldn't 'Environmental Management' be a discipline that takes centre stage, especially in institutions that groom people on management and leadership? This is happening gradually, though many a times, not out of a conscious and mindful choice, but because of a forced compulsion. I have stoically acknowledged the shift in global warming discussions—from attempts to mitigate global warming to that of adaptation measures—a shift that is also partially driven by the melancholic acceptance and certainty by the global community, that we have irresponsibly created certain planetary phenomena that are now irreversible.

What is unique about climatic and environmental effects is that they are not constrained by national and geographic boundaries, but affect both at the macro and micro levels. While the drying up of rivers in the rice bowl district of Palakkad in Kerala can be considered a regional issue, this is also partially caused by the same phenomenon that melts the Arctic ice. Melting of Himalayan glaciers not just affects Indians, but directly affects citizens of other countries, and also has the potential to indirectly affect global commodity prices. Ill health resulting from the usage of the endosulfan pesticide may be projected as regional, but it will affect all the regions to where the crops subjected to this pesticide are exported. Plastic disposal is an issue for most local bodies of governance, but soon these disposed plastics reach oceans, form garbage patches, affect aquatic life forms, and re-enter the food chain, thereby affecting humans again. This textbook delves into such environmental issues that affect us all.

Clearly, the situation is grave. However, human beings have the inherent capability to be optimistic even in the gravest of the situations. Viktor Frankl should be nodding; and I have evidence(s) to support this. *Ecosia.org*, a less than ten member start-up that runs a search engine donates almost 50% of its advertisement revenue to green projects, and has

contributed more than 15 crores of rupees in the initial five years of its existence. Shubendu Sharma has been creating urban forests through his venture *Afforestt*, and Veni Madhvi has been nurturing sacred groves through *Vedic Vanas*. We see the increasing popularity of organic products, the emergence of eco-labels that support socially responsible and environment-friendly business practices, and governments choosing to promote mass rapid transportation systems. More than 50 lakh people from around the world have supported a Greenpeace online campaign to create a global sanctuary in the Arctic region. Countries such as Ecuador and Bolivia have given legal rights to nature itself. United Nations and civil society groups have been facilitating dialogues and discussion resulting in global treaties that promote sustainable development. In addition to introducing the reader to similar developments that give hope and reasons to cheer, the textbook also explores the connection between business and sustainability practices, including the oft-repeated 'business case'.

The textbook team has endeavoured to make this work beneficial for many in the following ways:

- Attempt was made to make the textbook as comprehensive as possible, while acknowledging that a boundary needs to be drawn for any topic, including *Environmental Management*. Thus, a reader would discover that, along with the existence of the conventional topics such as bio-diversity, waste management, renewable energy, polluter pays principle, energy efficiency, disaster management, negative externalities, and many more, the textbook also delves into emerging and specialized areas, ideas, and topics, such as 5Rs, genuine progress indicator, spirituality and ecology, reading a sustainability report, etc.
- The content of the textbook is supported by research, and significant efforts have gone into developing research-based content.
- A number of examples indicating the practice of environmental management have been provided. These examples, both Indian and global, are worthy of emulation. Some of these examples, which have been provided in boxed contents, are spread across various chapters, and need not have direct connection to that specific chapter, though they do have connection with the overall theme of the textbook.
- In addition to these examples, the textbook also has an exclusive section that offers detailed case studies and shorter caselets and the online resources centre has an Instructor's manual and PowerPoint presentations. This will aid the faculty members to facilitate discussions amongst the students.
- The language used is simple, so that even a high-school student will be able to understand the ideas presented. Even the style used in footnotes is to communicate utility and ease of use, and not a blind adherence to any particular referencing style, except in those cases where the copyright holders asked the referencing to be done in a specific way.
- Attempts were made to make the textbook content presentable and welcoming. A number of visual images and photographs have been used so that the reader is able to receive the message effectively and with emotional connect. We have gone



for higher quality printing, while also attempting to keep the cost of the textbook affordable, so that a large number of students and readers can access the book.

We have aimed to create a textbook that is world class. This book has happened because of the efforts and sacrifice of innumerable beings—those who offered food to the author thereby sustaining his body, those who provided the content and knowledge resources free of cost, those who were displaced from their lands due to the construction of power projects that generated electricity to power the laptop and internet that supported this textbook-writing effort, those who offered the possibility of creating this textbook, those who willed that this textbook be published, those who contributed to the improvisation and publication of this textbook, those who dedicated their life for noble causes that are being chronicled in the textbook, those who provided the supportive infrastructure, and more.

I've observed that, for some of the most inspiring creations that have happened in India, it has been difficult to find the name of the creator/inventor/discoverer associated with that work. While their works benefitted the world, the creators chose to remain anonymous. With the passage of time, their names dissolved into the Universe. Due to my admiration to that practice and respect for such individuals, I pondered over the possibility of following their footsteps, on whether an author's name really needs to be included. The answer was Yes—that I need to attribute an author's name—primarily due to the concern and consideration for easing the rigours of daily existence for many. However, the dilemma on whether my decision is ideal continues.

This work is a *yagna* or a sacrifice (sacrifice, from its Latin roots, means, to make a process holy or sacred). The author will not be taking any royalty from the sales of the textbook. The author's royalty is being channelized towards subsidizing the cost of the textbook.

Punya (merits) accrued in a sacrifice is to be shared for the common good and well-being of all species. This is done through extending an invite to all to participate in this sacrifice, and by creating opportunities for all to contribute to the fulfilment of its objectives. I've given my efforts to this *yagna* and continue to do so. If you are convinced that this work is worthy of respect, I invite you to join in this endeavour. You can share this book with your friends and well-wishers, gift copies of this book to many, write reviews about this book, promote this book among your circles, make postings about this book in social media and 'like' it, recommend this book to students, faculty members, and academic institutions, and most importantly, incorporate learnings from this book in your own life, on a daily basis (Do not miss the section on Reflective Questions, Recommended Books, and Recommended Documentaries/Movies at the end of various chapters).

This textbook is dedicated to *The Universal Feminine*.

Thank you.

Ajith

Features of the Book

Dedicated chapters to important concepts

Contains important chapters that lay emphasis on companies/industries finding solutions to various environmental issues

5

BUSINESS AND SUSTAINABILITY

6

PROCESSES, TOOLS, AND STANDARDS FOR ENVIRONMENTAL MANAGEMENT

In 2014, Tata Global Beverages Limited (formerly Tata Tea Limited), joined the Tea 2030 partnership. The partnership will focus on (a) sustainable production that benefits the communities and the natural environment where tea is cultivated, (b) engaging consumers so that they demand more sustainable tea, and (c) providing values to all players in the supply chain. Other members of this alliance include Unilever, Rainforest Alliance, Fairtrade International, Yorkshire Tea, Finlays, the Ethical Tea Partnership, and IDH Sustainable Trade Initiative.

On 23 September 2013, Indian Institution of Corporate Affairs (IICA) and Bombay Stock Exchange (BSE) Ltd. entered into an arrangement to develop a Corporate Social Responsibility (CSR) index for Indian companies listed in BSE.

Side bars

Contains numerous side bars throughout the book with interesting/informative facts to build the students' interest in the subject

Images

Contains numerous vivid images that attempt to give a broader perspective to the concepts discussed



FIG. 1.17 Male, the capital of the Maldives

TABLE 3.3¹⁸ Average noise levels (in decibels) at different places of Delhi

Location	2012		2013	
	Average day	Deepavali day	Average day	Deepavali day
Lajpat Nagar	58			
East Arjun Nagar	57			
Mayapuri Vihar Phase – II	48			
Pitampura	56			
Kamla Nagar	61			
Dilshad Garden	58			
Ansari Nagar	58			
Connaught Place	64			

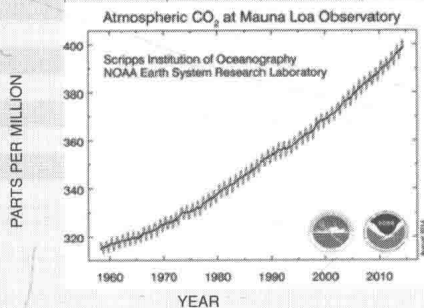


FIG. 3.10¹⁷ CO₂ concentrations measured at the Mauna Loa observatory, Hawaii

Figures and Tables

Every chapter contains several figures and tables to support the concepts discussed

Chapter-end exercises

Provides exhaustive chapter-end exercises such as multiple-choice questions, short answer, long answer, and reflective type questions, as well as take-home activities for students to test their understanding

CHAPTER SUMMARY

- Pollution refers to the contamination in a natural substance that interferes with the health of any living organism or cause harmful environmental

- Marine Pollution occurs due to the introduction of unnatural materials like pesticides, industrial and agricultural waste, and chemicals that are

KEYWORDS

- Pollution
- Air pollution

Short Answer Questions

- Define pollution and its types.

Long Answer Questions

- What is meant by ecological footprint? its significance? How is it different from footprint?

Reflective Question

You would have noticed that the societal trend

Take-home Activity

Select any natural ecosystem near your educational

Multiple-choice Questions

- _____ is harmful for plant and animal
peeling of paint, affect soil chemistry.
(a) Acid rain
(b) Soil pollution
(c) Water pollution
(d) Degradation

Additional resources

Each chapter provides a selection of recommended books, videos, and documentary films for interested readers to learn more about the subject

Recommended Book

- Pathak, Bindheshwar, *The Road to Freedom: A Sociological Study on the Abolition of Scavenging in India*, Motilal Banarsidass, 2000.

Recommended Documentaries/Movies

- Minus One Project of Sansung Printers, 2012 (This short clipping is available for

watch/ and <https://www.youtube.com/watch?v=Se12y9hSOM0>. Duration: 8 minutes

Case Studies and Caselets

An exclusive section that details environmental management techniques and sustainable practices adopted by various organizations is included

CASE STUDY 1

THE STORY OF ETHICUS—INDIA'S FIRST ETHICAL FASHION BRAND

"We have got this big problem with our lifestyle, which is not as friendly. Ethics is not just about the fabric, it's not just about organic cotton, it's about a new kind of lifestyle. The very process is organic. In my opinion, I've been focusing on socially and environmentally responsible design. Ethics was very much related to this ideology, they are socially and environmentally responsible, and it is an ideal company that says I respect their nature as up and it was very encouraging."

Rahul Mishra, Fashion Designer, explaining his association with Ethicus

CASELET 1

AAROGYAPACHA AND JEEVANI

In December 1987, a group of researchers, led by Dr P. Pushpangadan from The Tropical Botanical Garden Research Institute (TBGRI), travelled to the forests of Western Ghats section in southern Kerala as part of All India Coordinated Research Project on Ethnobotany (AICRPE). Kani tribe, a tribe indigenous to the region, was a nomadic community of approximately 16,000 people. "We went there to survey the Kani tribal settlements, but we got exhausted after a long walk. When they saw us tired, some of the Kani tribesmen, who were our guides, offered us fruits of a plant. We ate them and

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1

REALM OF ECOLOGY AND ECOSYSTEMS

After reading this chapter, the reader will be able to understand the following:

- Definition, concepts, scope, and importance of ecology and ecosystems
- What the various ecosystems are
- Evolution of concepts and practices related to sustainable development at a national and international level
- National Environmental Policy, National Action Plan on Climate Change, and National Water Policy

Samudra Vasane Devi
Parvatha Sthana Mandale
Vishnu Patnee Namasthubhyam
Paada Sparsam Kshamaswa me

Oh Mother Earth! O Great Goddess shining in the apparel of the ocean and conveying maternal love through the beautiful hills which are your limbs! I bow unto Thee, the beloved consort of Lord Vishnu, who sustains the whole creation! Mother, forgive me, as I touch you with my feet!

This prayer, *Bhumi Vandanam* (Salutation to Mother Earth), is chanted by many *Bharatheeyas* (Indians) as they wake up from their sleep and before they place their feet on the ground. It is a paradox that a culture rooted in such lofty thoughts is now in a situation where even holy rivers such as the Ganga and the Yamuna have high levels of pollution.

DEFINITION AND ETYMOLOGY

The word 'ecology' has its origins in the Greek and German languages. The word 'Oecology' evolved from the German word 'Okologie', a term coined by Ernst Haeckel, a German biologist and philosopher. 'Oikos', in Greek, means house or household. In ancient Greece, the family unit was large and 'oikos' referred to the house, the extended family, farmland, etc. Thus, ecology could refer to writings, discourses, collections, science, or the study of the household. Ecology is the study of the interlinkages between living organisms along with their physical, chemical, and biological environment.

Though ecology and environment are used synonymously, there is a difference in their meaning. Ecology, as a sub-discipline of biology, is related with the study of life. Ecology, therefore,



is closely related to evolutionary biology, physiology, and genetics. The study of ecology explores the movement of energy and materials through living communities, the distribution of organisms and bio-diversity, and the life process and adaptations of organisms. An ecosystem is a biological community along with its physical environment. Living and non-living entities are connected through nutrient cycles and energy flows. Environment refers to the aggregation of surroundings, conditions, and influences in relation to a considered entity. The National Environment Policy (NEP), 2006, refers to 'Environment' as that which 'comprises all entities, natural or manmade, external to oneself, and their interrelationships, which provide value, now or perhaps in the future, to humankind'. The policy document also states that 'Environmental concerns relate to their degradation through actions of humans'. Environmental management is a branch of study that deals with managing the resources of the planet in a way that benefits the well-being of all species, and sustains resources for use by future generations.

SCOPE AND IMPORTANCE

Since the industrial revolution, nations have taken the path of growing their economies without any regard for the environment. This was particularly so for nations in Europe, the Americas, and other rich countries. An example of this negligence is indicated by the incident of a river catching fire—the highly polluted Cuyahoga River, Ohio, USA—as recently as in 1969. The TIME magazine reported, 'No Visible Life. Some river! Chocolate-brown, oily, bubbling with subsurface gases, it oozes rather than flows. "Anyone who falls into the Cuyahoga does not drown", Cleveland's citizens joke grimly. "He decays."' ¹ This was true for all nations. Such negligence and exploitation has resulted in species becoming extinct.

Human intervention has resulted in a massive decline of bio-diversity due to habitat destruction, the release of toxins, the usage and release of harmful chemicals, over-harvesting, and more. The extinction of species is a natural phenomenon and massive bio-diversity losses have occurred five times in the past 540 million years. However, the current ongoing massive decline, referred to as the 'sixth extinction wave' ², is the first wave to occur during the existence of human beings and has been induced by their behaviour. This extinction wave is the greatest since the dinosaurs disappeared 65 million years ago. ³ It is now estimated that species are becoming extinct at 1000 times the natural rate. ⁴ Biologists have mentioned that if this continues unabated, it could

1 <http://www.time.com/time/magazine/article/0,9171,901182,00.html>, last accessed on 24 June 2012.

2 Gerardo Ceballos, Andrés García, Paul R. Ehrlich, 'The Sixth Extinction Crisis: Loss of Animal Populations and Species', *Journal of Cosmology*, Vol 8, 2010, pp. 1821–1831.

3 *Millennium Ecosystem Assessment: A Toolkit for Understanding and Action*, Island Press, March 2007, http://islandpress.org/assets/library/27_matoolkit.pdf, last accessed on 8 August 2011.

4 <http://news.bbc.co.uk/2/hi/science/nature/8449506.stm>, last accessed on 27 September 2012.

5 Gerardo Ceballos, Andrés García, Paul R. Ehrlich, 'The Sixth Extinction Crisis: Loss of Animal Populations and Species', *Journal of Cosmology*, Vol 8, 2010, pp. 1821–1831.

be a harbinger of the downfall of the human civilization and the premature demise of billions of people.⁵ The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) states that ‘The atmospheric concentrations of carbon dioxide (CO₂), methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. CO₂ concentrations have increased by 40 per cent since pre-industrial times, primarily due to fossil fuel emissions and secondarily due to net land use change emissions. The ocean has absorbed about 30 per cent of the emitted anthropogenic carbon dioxide, causing ocean acidification.’⁶ The report also predicts the continuing warming of the global ocean. Global warming will also result in ice melting at an abnormal rate (Refer Fig. 1.1.). As heat from the surface of the ocean penetrates into the deep ocean, ocean currents and circulation will get affected.



FIG. 1.1⁷ Male, the capital of the Maldives

Due to climate change and the expected rise of water levels, Maldives, an island inhabited by more than 300,000 people, is expected to be submerged within a century.

In 2005, more than a thousand of the world's leading biological scientists released *The Millennium Ecosystem Assessment*. They analysed the state of the planet's ecosystem and provided guidelines for decision-makers. *The Millennium Ecosystem Assessment* states, ‘In the last half-century, people have made unprecedented changes to the planet's ecosystems — largely to meet rising demands for food, fresh water, fibre, and energy’ and adds that almost 60 per cent of the ecosystem services examined as part of the *Millennium Ecosystem*

6 http://www.ipcc.ch/news_and_events/docs/ar5/ar5_wgl_headlines.pdf, last accessed on 6 October 2013.

7 Photo by Shahee Illyas, used with permission. Image source: <http://commons.wikimedia.org/wiki/File:Male-total.jpg#mediaviewer/File:Male-total.jpg>, last accessed on 14 July 2014.

Assessment were degraded or were used in unsustainable ways.⁸ The assessment found that of the 24 ecosystem services measured, only four showed an improvement during the previous 50 years and 15 ecosystem services were in serious decline. A key finding of the report is that 'Pressures on ecosystems will grow significantly worse during the first half of this century, unless human attitudes and actions change'.⁹

As per the United Nations Environment Programme Finance Initiative, 2010, human activity in 2008 amounted to \$6.6 trillion in global environmental damage, 33 per cent of which was caused by 3,000 of the world's largest publicly traded organizations. The *Living Planet Report 2010*, released by the World Wide Fund for Nature, the Global Footprint Network, and the Zoological Society of London, indicated that the ecological footprint exceeded the earth's bio-capacity by 50 per cent (refer Fig. 1.2). This meant that it takes 1.5 years for the Earth to produce the resources that humanity currently consumes in one year. The report goes on to state that we would be requiring one more planet by 2030, if we continued our lifestyle of 'business as usual'. 'If everyone in the world lived like an average resident of the United States or the United Arab Emirates, then a bio-capacity equivalent to more than 4.5 Earths would be required to keep up with humanity's consumption and CO₂ emissions,' says the *Living Planet Report*.¹⁰

Global Ecological Footprint
Human demand on the biosphere more than doubled between 1961 and 2007 (Global Footprint Network, 2010)

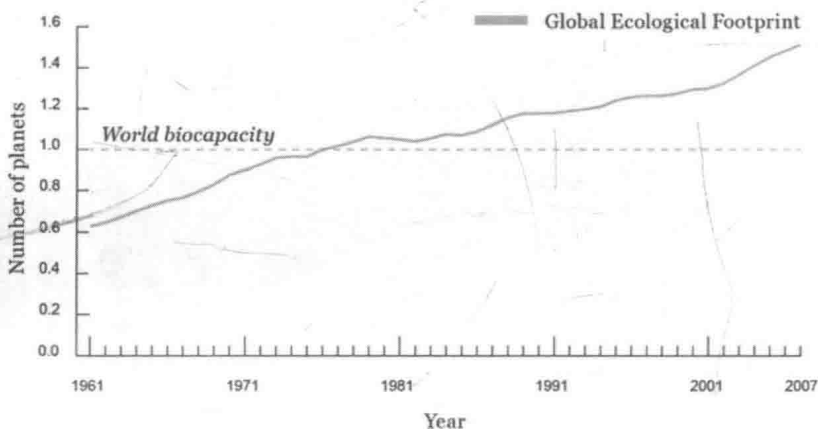


FIG. 1.2 Global ecological footprint

Source: WWF 2012. *Living Planet Report 2010*. WWF International, Gland, Switzerland¹¹

⁸ *Millennium Ecosystem Assessment: A Toolkit for Understanding and Action*, Island Press, March 2007, http://islandpress.org/assets/library/27_matoolkit.pdf, last accessed on 8 August 2011.

⁹ *Millennium Ecosystem Assessment: A Toolkit for Understanding and Action*, Island Press, March 2007, http://islandpress.org/assets/library/27_matoolkit.pdf, last accessed on 8 August 2011.

¹⁰ http://wwf.panda.org/about_our_earth/all_publications/living_planet_report/2010_lpr/lpr_2010_media-center/, last accessed on 27 May 2011.

¹¹ *Living Planet Report 2010*, http://awsassets.panda.org/downloads/wwf_lpr2010_lr_en.pdf, last accessed on 8 October 2013. Used with permission.